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WHAT IS CLAIMED IS:

1. A method for testing the integrity of at least one filter element arranged in a device, said method comprising:

(a) filling pores of the filter material of the at least one filter element in the device with a wetting liquid,

(b) purging at least the retentate side of the at least one filter element in the device with a first gas,

(c) pressurizing the at least one filter element with the first gas under a test pressure and at a test temperature,

(d) measuring the volumetric flow rate of the first gas through the at least one filter element at the test pressure,

(e) degassing the device,

(f) repeating steps (b) to (d) with a second gas,

(g) determining the ratio of the volumetric gas flow rates,

(h) determining the ratio of the solubility or diffusion coefficients of the gases in the wetting liquid at the test temperature, and

(i) determining a convective component of the volumetric gas flow rate,

wherein the ratio of the solubility or diffusion coefficients of the first and second gases in the wetting liquid at the test temperature is at least 1.25:1 and the viscosities of the gases at the test temperature do not differ by more than 50%.

2. A method according to claim 1, wherein the convective component of the volumetric gas flow rate is determined by calculating the volumetric gas flow rate due to convection through the at least one filter element.

3. A method according to claim 1, wherein the convective component of the volumetric gas flow rate is determined by comparing the ratio of the volumetric gas flow rates with the ratio of the diffusion coefficients.

4. A method according to claim 1, wherein a maximum allowable convective component of the volumetric gas flow rate is determined by correlation to an independent retention test.

5. A method according to claim 4, wherein the retention test is a protein retention test, a virus retention test, or a bacteria challenge test.

6. A method according to claim 1, wherein a plurality of like filter units are arranged in the device, and the determination of the ratio of the solubility or diffusion coefficients of the two gases in the wetting liquid in step (h) comprises measuring the volumetric flow rates in a single filter element of the same type which is known not to have defects or excessively large pores which would enable a convective gas flow to occur.

7. A method according to claim 1, wherein steps (c) and (d) for the first and second gases are carried out at a plurality of test pressures.

8. A method according to claim 1, wherein the ratio of the diffusion coefficients of the two test gases at the test temperature is at least 30:1.

9. A method according to claim 1, wherein the first gas is CO_2 and the second gas is air or nitrogen.

10. A method according to claim 1, wherein the at least one filter element has a total membrane area of 0.05 to 90 m^2.

11. A method for testing the integrity of at least one filter element arranged in a device, said method comprising:
(a) filling pores of the filter material of the at least one filter element in the device with a first wetting liquid,

(b) purging at least the retentate side of the at least one filter element in the device with a test gas,

(c) pressurizing the at least one filter element with the test gas under a test pressure and at a test temperature,

(d) measuring the volumetric flow rate of the test gas through the at least one filter element at the test pressure,

(e) degassing the device,

(f) replacing the first wetting liquid in the pores of the filter material of the at least one filter element in the device with a second wetting liquid,

(g) repeating steps (b) to (e) with the second wetting liquid,

(h) determining the ratio of the volumetric gas flow rates,

(i) determining the ratio of the solubility or diffusion coefficients of the test gas in the wetting liquids at the test temperature, and

(j) determining the convective component of the volumetric gas flow rate,

wherein the ratio of the solubility or diffusion coefficients of the test gas in the first and the second wetting liquids at the test temperature is at least 1.25:1.

12. A method according to claim 11, wherein the convective component of the volumetric gas flow rate is determined by calculating the volumetric gas flow rate due to convection through the at least one filter element.

13. A method according to claim 11, wherein the convective component of the volumetric gas flow rate is determined by comparing the ratio of the volumetric gas flow rates with the ratio of the diffusion coefficients.

14. A method according to claim 11, wherein a maximum allowable convective component of the volumetric gas flow rate is determined by correlation to an independent retention test.

15. A method according to claim 14, wherein the retention test is a protein retention test, a virus retention test, or a bacteria challenge test.

16. A method according to claim 11, wherein a plurality of like filter units are arranged in the device, and the determination of the ratio of the solubility or diffusion coefficients of the test gas in the two wetting liquids in step (i) comprises measuring the volumetric flow rates in a single filter element of the same type which is known not to have defects or excessively large pores which would enable a convective gas flow to occur.

17. A method according to claim 11, wherein steps (c) and (d) for the first and second wetting liquids are carried out at a plurality of test pressures.

18. A method according to claim 11, wherein the ratio of the diffusion coefficients of the test gas in the two wetting liquids at the test temperature is at least 1.25:1.

19. A method according to claim 11, wherein the first wetting liquid is ethanol and the second wetting liquid is water.

20. A method according to claim 11, wherein the test gas is selected from the group consisting of air, CO_2 and nitrogen.

21. A method according to claim 11, wherein the at least one filter element has a total membrane area of 0.05 to 90 m^2.